ENVIRONMENTAL ASSESSMENT

AND

SECTION 404 EVALUATION

FOR

STREAMBANK EROSION CONTROL

EVALUATION AND DEMONSTRATION

PROJECT (SECTION 32)

HAVERHILL, NEW HAMPSHIRE

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

MAY 1978

ENVIRONMENTAL ASSESSMENT

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INTRODUCTION

Section 32 of the 1974 Water Resources Act (Public Law 93-251), entitled "Streambank Erosion Control Evaluation and Demonstration Act of 1974" has three major provisions; an evaluation of the extent of streambank erosion on the nation's rivers, the development and reporting of new methods of bank protection, and the construction of demonstration streambank erosion control projects at various locations within the United States. This project deals only with the last of these provisions within the New England area.

Locations of known streambank erosion problems in New England were screened and two sites on the Connecticut River were identified as being most appropriate for inclusion in the program. (Haverhill, N. H., and Northfield, MA.). These sites were selected because they have a serious erosion problem, they are typical of many miles of eroded bank, and because they present an opportunity to experiment with a variety of bank protective techniques.

As with most river banks in New England, the two selected sites are located on private property. The corrective measures which are proposed are considered a minimum of protection which can reasonably be expected to perform satisfactorily with a minimum of maintenance or replacement cost.

Work began in April 1976 on this program which is being carried out under the authority of Public Law 93-251, Section 32. The act provides for the updating of the 1969 National Streambank Erosion Survey, but more importantly, the Act provides for the construction of Demonstration Streambank erosion projects throughout the United States.

The purpose of the project is to experiment with new and perhaps innovative techniques of streambank protection. Techniques which are least expensive to install will be given particular attention. This latter point is important because the project is to demonstrate methods that would also be suitable for local implementation utilizing their own resources. Construction is planned for the summer of 1978. The projects would be monitored until 1981 when they would be turned over to local authorities for operation and maintenance. This assessment will only address the site at Haverhill, New Hampshire (Site Number 79).

I. PROJECT DESCRIPTION

The proposed project (Area 79) is located in Haverhill, New Hampshire, about one mile downstream from the Newbury-Haverhill bridge, as shown in Fig. 1. This actively eroding streambank extends to a height of 5 to 15 feet above the normal water surface and is approximately 2,000+ feet long. Although this site is located in the upper reach of the pool formed by the Wilder hydroelectric dam, it is significantly affected by open channel flow conditions. The study reach is at the outside of a 70 degree bend in the Connecticut River. This area is greatly affected by high local velocities and eddies under natural conditions, with even more damage resulting from ice floes during the spring runoff.

In order to alleviate the problem of erosion, the toe of the slope must be stabilized. The bank sloughing is caused when high flows are projected against the bank, causing the soil at the toe of the slope to erode. This undermines the embankment causing large dumps of upper bank material to break away. Different methods of toe stabilization will be employed and monitored to ascertain the effectiveness of each. Coupled with the toe protective measures will be vegetative plantings used to stabilize the upper slopes.

The demonstration area will be divided generally into five segments, each about 500 feet long. Each of these segments will be separated by a low gabion wall embedded into the slope. (A gabion is a wire-mesh basket filled with rock). This method will hopefully prevent a domino-affect of slope failure of one segment if adjacent techniques are not successful. The first 500 foot segment of toe protection will be accomplished by using a 9 inch thick gabion mattress layed along the slope and placed 3 feet below the low water line. (In some instances gravel fill will have to be dumped to provide a stable foundation for the toe protective devices). The next 500 foot segment will be constructed of used tires, with the first 250 feet having the tires filled with rock, and the last 250 feet having the tires empty. The third section will be constructed of bags filled with a combination of sand and cement for hardening. The fourth segment will utilize hay bales for toe protection. The bales will be anchored in place to prevent them from floating away. The last segment will have no toe protection, thus providing a base from which the other methods can be monitored.

The first 1,000 feet of protection will be constructed on the existing natural slope conditions, with only slight grading and trimming to smooth out the slope. The next 1,250 feet will be cut back to a 1 on 2 slope. The last 250' will again be left with the natural slope and minimal grading. Various planting techniques and combination of plant materials (sod, grasses, shrubs) will be employed on the entire upper portion of the bank.

II. ENVIRONMENTAL SETTING

The proposed project is located on the Connecticut River in Haverhill, New Hampshire. It is situated along an eroding riverbank adjacent to private property, which is used for agricultural purposes. (See Fig. 2) The project area lies in the upper reaches of the Wilder Dam hydroelectric pool, which floods 45.5 miles of the Connecticut River from Wilder, Vermont to a point 3 miles downstream of the Wells River.

The hydrologic conditions at the project site are best represented by the records of the U. S. Geological Survey gage located 11 miles upstream on the Connecticut River at Wells River, Vermont (drainage area = 2,644 square miles). The average flow at the gage during the summertime low flow season (July-October) is 3,450 cfs and during the spring snowmelt months (April-May) is 15,635 cfs. The average annual peak discharge has been 33,100 cfs since completion of the last major upstream storage project in 1961. During such an event, high flows overtop the banks which is typical of the upper reach of the Connecticut River. At this particular site, high flows have passed over the top of bank, running down through an adjacent cornfield and rejoined the river at the next channel bend. The river is attempting to create an oxbow which would result in 30 acres of farmland being turned into an island.

The annual mean flow is 4,810 cfs; however, during the day flows may fluctuate from 1,000 to 6,000 cfs due to the operation of upstream power dams. During such normal flow periods the water surface at the project site varies from 1 to 1-1/2 feet per day between elevations 386 to 383 feet msl over the weekly period. Under normal flow conditions, local velocities at the toe of the bank have been computed to vary from 0 to 2 fps. During a high flow of approximately 15,000 cfs a toe velocity of 4 fps was measured by a current meter.

There is a minimum amount of vegetation in the immediate project area. Plants which are native to the area include red and silver maple, elm, willow, cherry, poplar, and alder. They grow in the wet soils along the river. Soils at the project site include sandy silt at the top of the bank progressing to clayey sandy silt at the water's edge.

Low Fish and wildlife resources are typical of those found in the ~~upper~~ Connecticut River basin. Fish species include ~~brook trout~~, ~~brown trout~~, ~~rainbow trout~~, smallmouth bass, largemouth bass, chain pickerel, bullhead, yellow perch, white perch, sunfish, blue gill, rock bass, suckers, fall fish, minnows, darters, carp, walleye, and northern pike. Wildlife which could be expected to be in the

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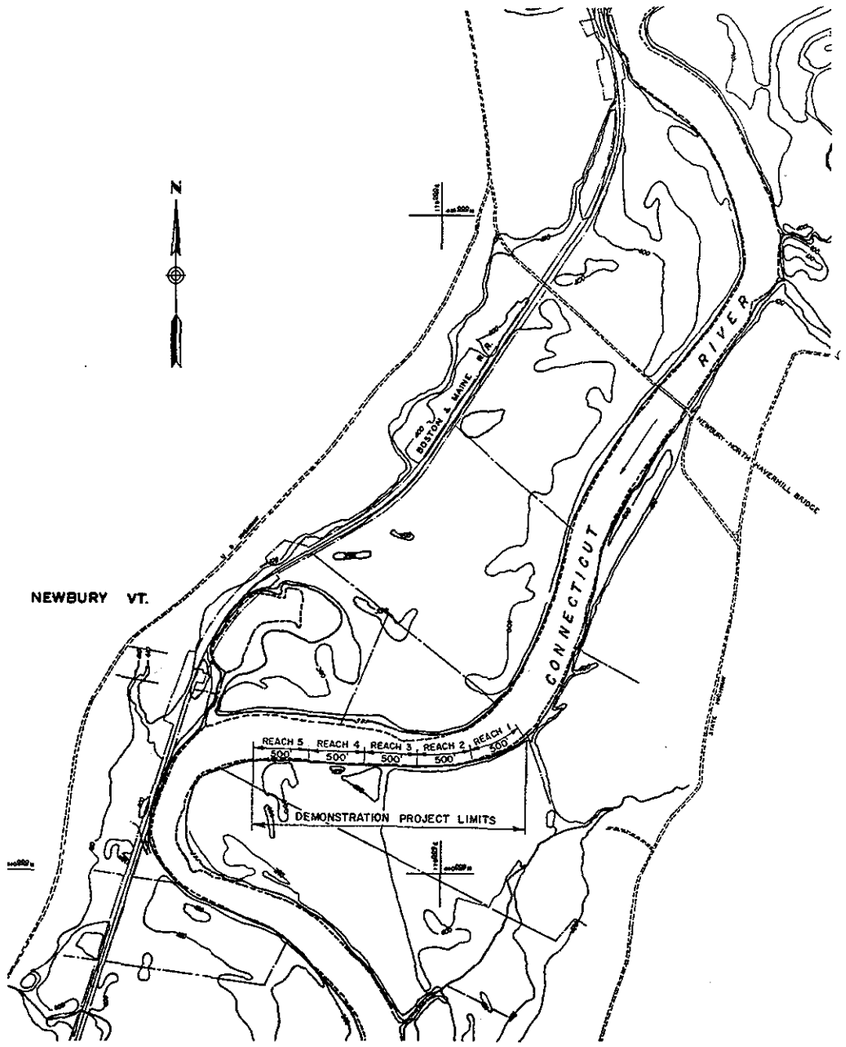
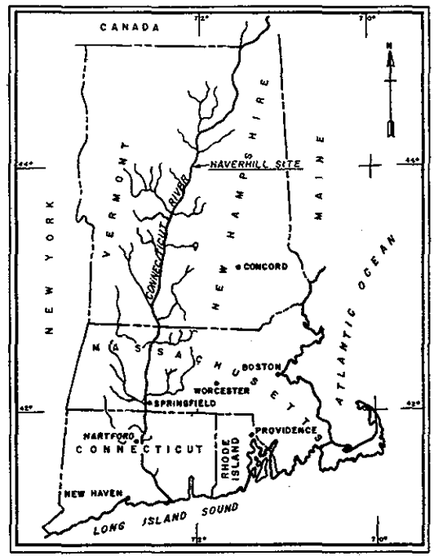


GENERAL PLAN
SCALE 1"= 500'



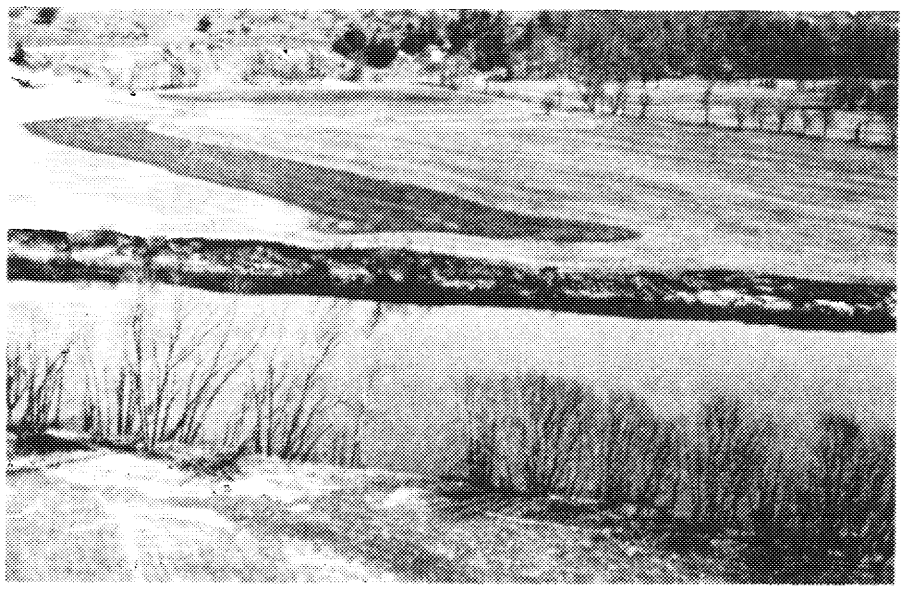
REGIONAL MAP
SCALE
10 0 10 20 30 40 50 MI.

GRAPHIC SCALE
1"=500' 500' 0 500' 1000'

WATER RESOURCES PILOT PROJECT
CONNECTICUT RIVER BASIN
HAVERHILL, NEW HAMPSHIRE
STREAMBANK EROSION (SECTION 32)

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

FIGURE 1



CONNECTICUT RIVER BANK EROSION

HAVERHILL, NEW HAMPSHIRE

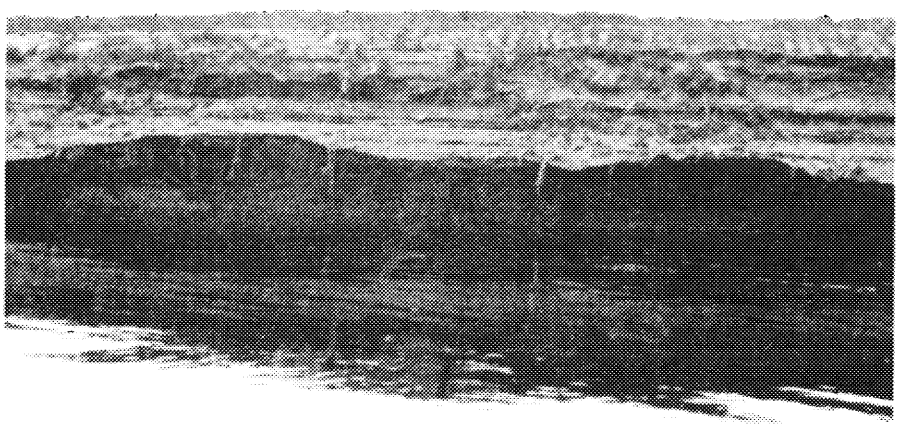


FIGURE 2

project area include white-tailed deer, ~~black bear~~, ruffed grouse, woodcock, snowshoe hare, squirrel, ~~moose~~, bobcat, raccoon, porcupine, and skunk. Woodchuck and pheasant are commonly associated with farmlands or fields. Fur-bearing mammals include muskrat, mink, beaver, otter, ~~coyote~~, and fox. Principal waterfowl resources of the region include black duck, mallard, wood duck, teal, merganser, ~~scaup~~, bufflehead, Canada geese, snow geese, and ~~grebe~~.

The population of Haverhill (3,000 in 1970) and vicinity has declined in the last decade. Most of the labor force consists of people engaged in manufacturing, light industry, agriculture, and the tourist trade. There is also a significant amount of self-employed people in the region. The area at one time served as a distribution center for dairy farms in northern New Hampshire and Vermont.

III. IMPACTS OF THE PROPOSED ACTION

There will be both positive and negative impacts associated with implementation of the project. Most of the impacts will be concerned with the construction activities needed to protect the eroding streambank. There will be the short-term impact of increased noise, dust, and traffic on local roads. These effects can be minimized by proper traffic circulation, and adherence to established noise and dust control procedures.

Since construction will take place along the river's edge, with the bank being reshaped and graded back in sections, a relatively small amount of fill material will fall into the river. Also, materials to protect the toe of the bank will be placed in the water. This activity will cause an increase in turbidity, with water quality being degraded for a short time. This will not be a long-term negative impact, but rather a positive one which will prevent the erosion and turbidity.

IV. AQUATIC ECOLOGY

The actual construction of the erosion control items will increase turbidity and downstream sedimentation while equipment is grading and filling the existing streamside. However, it is doubtful that this will have a noticeable impact on nearby aquatic biota, since the existing habitat is one presently experiencing intermittent periods of high turbidity and sedimentation. Any fish species or other aquatic biota within the area should be tolerant of such conditions.

The longer range effects of the project should mitigate this stressed situation, possibly enhancing the productivity and health

of the aquatic environment. In addition to reducing turbidity and sedimentation, the area of the streambank itself will provide a stable habitat for various botanical species, benthos, and other bottom dwelling organisms (the existing bank is too unstable to support any aquatic life). The project should in the long term provide a noticeable benefit to the local aquatic ecosystem.

The state historic preservation officer has been informed of the project. No impacts to cultural resources is anticipated; verification of this is in process.

There will be other positive impacts associated with the project. The riverbank presently lacks any aesthetic appeal, and in fact, takes away from the scenic qualities of the area. By stabilizing and revegetating the bank, the aesthetics will be upgraded to be more in keeping with the area. The project will also be beneficial in that it will protect productive farmland from erosion.

V. ALTERNATIVES TO THE PROPOSED ACTION

Even though the project will alleviate a serious streambank erosion problem, it was not designed as a result of demands put forth by the local community. The project concerns itself with monitoring specific techniques which control erosion along the river. It was selected since erosion was a very real occurrence at the site.

Different alternative methods to control streambank erosion are a part of the project plan. These are discussed in detail under Section 1, Project Description.

If this site were not chosen, probably no work would be attempted to curb the erosion process. The river could then possibly, under high flow conditions, cut across the adjacent field creating an oxbow lake.

VI. CONCLUSIONS

Upon evaluating the information presented in this Environmental Assessment Report, it is my belief that the streambank erosion control project in Haverhill, New Hampshire is in the best public interest. Exploring ways to curb destructive erosion will be useful to numerous groups in the country.

The project will be beneficial by encouraging the establishment of aquatic communities, reducing erosion and siltation, increasing scenic quality, and protecting productive agricultural land. Water quality and turbidity will be degraded during construction, but will not cause any long-term adverse impacts.

VII. COORDINATION WITH OTHER AGENCIES

During the survey and preparation of this project the following Federal, State, and local agencies were contacted and consulted for input into the study:

Department of Agriculture, Soil Conservation Service

New Hampshire Water Resources Board

New Hampshire Fish & Game

Grafton County, New Hampshire Conservation District

Town of Haverhill, New Hampshire

Questions or comments relevant to this assessment report should be directed to the Environmental Analysis Branch, New England Division, Corps of Engineers.

In my evaluation, this assessment has been prepared in accordance with the National Environmental Policy Act of 1969. It is being coordinated with the Soil Conservation Service. Based on the scope and type of construction proposed, it appears that implementation of the project can be accomplished with minimal environmental impact. The assessment therefore precludes the need for preparation of a formal Environmental Impact Statement at this time.

8 May 1978
(Date)

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

THE FEDERAL WATER POLLUTION CONTROL ACT

SECTION 404 EVALUATION

STREAMBANK EROSION CONTROL EVALUATION

AND DEMONSTRATION PROJECT

HAVERHILL, NEW HAMPSHIRE

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS 02154

MAY 1978

Section 404 Evaluation for
Streambank Erosion Control, Haverhill, N.H.

Addenda and Errata

Addenda

1. Project Description, paragraph 1, page 1, after " (4) One 500 foot segment will be stabilized with hay bales." Add the following -- " (5) One 500 foot segment will be stabilized by planting grasses and vines thus providing a base from which the four structural methods can be monitored."

2. Evaluation Procedures, paragraph 2, page 2, after " of Sections 230.4 and 230.5." Add the following " Only those impacts associated with the four segments involving structural methods of streambank stabilization will be addressed. The fifth segment, planting grasses and vines, does not involve either the discharge of dredge material or placement of fill."

Errata

1. Project Description, paragraph 1, page 1, first sentence -- delete "...implementation of four methods ..." and add "... implementation of five methods ..."

2. Project Description, paragraph 1, page 1, second sentence -- delete "... on a 2000 foot long ..." and add "... on a 2500 foot long ..."

3. Project Description, paragraph 1, page 1, third sentence -- delete " The four methods ..." and add "The five methods ..."

4. Project Description, paragraph 1, page 1, sixth sentence -- delete "The four methods ..." and add "The five methods ..."

Project Description

The proposed project involves implementation of four methods to control Streambank erosion on a 2,000 foot long segment of the Connecticut River near Haverhill, New Hampshire. The four methods will be contiguously applied to a Streambank area that has been severly eroded during high flows. Each method will then be evaluated to determine its feasibility. The four methods can be summarily described as follows:

(1) One 500 ft. segment will be stabilized with a gabion mattress (a layer of rocks inclosed within wire cages).

(2) One 500 ft. segment will be stabilized with used tires; the first 250 feet having tires filled with rock, and the next 250, with empty tires.

(3) One 500 ft. segment will be stabilized with sand and cement filled bags.

(4) One 500 ft. segment will be stabilized with hay bales.

Purpose of "404" Evaluation

Implementation of these facilities will result in placement of fill material (the above listed items, as well as some grading of existing riparian soils). Therefore, in accordance with EPA guidelines (FRL 421-1), pursuant to Section 404(b) of the Federal Water Pollution Control Act Ammendments of 1972 (Pub. L. 92-500), this document has been prepared for the purpose of providing guidelines to be applied in evaluation of the affects of the proposed activity on water resources. Such a "404" evaluation is in response to the concerns of protecting vital national water resources from destruction through irresponsible and irreversible decisions. The scope of this evaluation is outlined in FRL 421-1, as follows:

Section

230.1 Purpose and scope

230.2 Definitions

230.3 Evaluation procedures

230.4 General approaches for technical evaluation

Section

230.4-1 Physical and chemical-biological interactive effects and approaches for evaluation.

230.4-2 Water quality considerations

230.5 Selection of disposal sites and conditioning of discharges of dredged or fill material

230.6 General or categorical permits

230.7 Advanced identification of dredged material disposal areas

230.8 Revision

Evaluation Procedures

According to the EPA guidelines for evaluation procedures, (Sec. 230.3) the ecological evaluation of the effects of the proposed project on water resources is accomplished by applying each of the provisions of Sections 230.4 and 230.5. The impacts of the project have been also assessed in accordance with the National Environmental Policy Act, 1969 (NEPA) and deemed not significantly adverse (in fact, the project will result in a net benefit to the aquatic ecology); an environmental impact statement is therefore not required, and the evaluation is based on information contained in the environmental assessment.

General Evaluation (Sec. 230.4)

The construction of the project elements will increase turbidity and increase downstream sedimentation while equipment is grading and filling the existing streambank. However, it is doubtful that a noticeable ecological effect will result. The existing aquatic biota are most likely tolerant of such effects because of the existing erosion condition.

The longer range effects of the proposed project should mitigate this stressed condition in the vicinity of the project. Although the extent of this project is probably not sufficient to significantly improve the present sedimentation pollution in the River as a whole, some turbidity will be reduced; and perhaps just as important, the area of the streambank itself will provide a stable habitat for various aquatic biota (the existing bank is too unstable to support any aquatic life). In addition, since this project is experimental in nature, the effects will be monitored, and the effectiveness of each method evaluated. This evaluation will provide for recommended design assistance to local concerns, and may be helpful in implementation of Streambank stabilization to a much greater extent in the

river as a whole. Such implementation would probably result in a significant benefit to the Connecticut River's aquatic ecology.

Technical Evaluation

The ecological impact from the proposed project can be divided into two main categories: (a) Physical effects; and, (b) chemical-biological interactive effects. A technical evaluation of the concerned factors regarding such effects as stated in Sec. 230-4-1 of the EPA guidelines is fulfilled by Table 1.

The general considerations and objectives concerning the choice of disposal location and timing of the activities as outlined in Section 230.5 are included in Table 2.

FRL 421-1 Reference Paragraph	Factors to Consider	Remarks
230.4-1(a)(1)	Physical effects - Destruction of wetlands	Not applicable. No wetlands will be affected.
230.4-1(a)(2)	Physical effects - effects on the water column	Reduction in light transmission, aesthetic values, and biological effects are considered insignificant due to the short term of such impacts and the existing condition.
230.4-1(a)(3)	Physical effects - effects on Benthic organisms	Sedimentation caused by construction of a new bank will be insignificant in view of existing conditions and short time frame of effects.
230.4-1(b)	Chemical-biological interactive effects	The elements of the proposed project are composed of materials having no capabilities for pollution of this nature.
230.4-1(c)	Comparison of sites	Not applicable. No dredged material is to be disposed.
230.4-2	Water quality considerations	Not applicable. There is to be no discharge of materials capable of influencing water quality other than short term turbidity as discussed under 230.4-1(a)

TABLE 1

Considerations Relating To Degradation of Water Use At Site	Remarks
230.5(b)(1-10)	
	(1) There are no municipal water supply intakes in proximity to the site;
	(2) There are no areas of concentrated shellfish production in proximity to the site;
	(3) There will be no significant disruption of fisheries resources;
	(4) There will be no adverse impact on wildlife habitat or marine or aquatic sanctuaries;
	(5) There are no recreational areas in proximity to the site;
	(6) The proposed activity will not jeopardize the continued existence of any threatened or endangered species, or habitat thereof;
	(7) The long term effect on benthos should be beneficial;
	(8) No wetlands are involved.
	(9) The long term effects on submerged vegetation will be beneficial; and,
	(10) Not applicable. No disposal of sediments is to be made.

TABLE 2

General Considerations and Objectives	Remarks
230.5(a)(1-8)	(1) No significant disruptions will affect the biological integrity of the aquatic ecosystem;
	(2) No significant disruption of the food chain will occur;
	(3) The activity should not inhibit movement of any aquatic fauna;
	(4) Not applicable. No wetlands are involved in any way;
	(5) No areas that function to retain natural high or flood water will be affected;
	(6) One of the projected effects of the project will be to reduce turbidity levels;
	(7) Aesthetic, recreational economic values should be improved; and,
	(8) Long term water quality effects are beneficial.

Considerations In Determining The Site And Disposal Conditions To Minimize Possibility Of Harmful Effects	Remarks
230.5(c)	(c) Not applicable - No disposal of sediments is to be made.
Contaminated Fill Restrictions	
230.5(d)	(d) The fill material is not contaminated with any chemical constituents harmful to the aquatic ecology.
Mixing Zone Determination	
230.5(e)	(e) This section is concerned with disposal of sediments - not applicable in this project.

Conclusion

In accordance with the provisions of EC 1165-2-125, 31 Jan. 1977, I have reviewed this "404" evaluation. From this review, I have determined that no significant adverse impacts to water resources should result from the Streambank Erosion Control project as described herein. In fact, in the long term, water resource concerns should benefit from this project.

8 May 1978
(Date)

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer